

Experimental simulations of European surface electron irradiation chemistry

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High-energy (<10 MeV) electrons constitute the bulk of the 7.9×10^{10} keV cm⁻² s⁻¹ incident particle flux at Europa. The resulting chemistry drives the production of oxidants at the surface and carries important implications for prebiotic chemistry and any organic or biogenic material exposed to the surface environment. Transport of such material to the putative sub-surface ocean could also carry implications for habitability. We have constructed a 10⁻⁸ torr vacuum chamber equipped with a 100 keV electron gun and a liquid nitrogen cryostat plate in order to simulate the electron irradiation environment of Europa. Results of our oxidant production experiments will be presented and preliminary results on our prebiotic chemistry experiments will be included.